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Pentagon Gets 60 Percent of R&D Total

Bush's Budget: More Cheers Than Money for Science

"A good budget" is how D. Allan Bromley, the President's Science Adviser, described the Administration's spending plans for research and development in the fiscal year that begins next October 1. That's standard talk from Presidential assistants, even when budgets are dismal. But the Bush budget for R&D, released on February 4, is a concoction of values and priorities that defies simple characterization.

The gross numbers are colossal: $76 billion is proposed for R&D, an increase of $8 billion, or 13 percent, over this year's level. Within the grand total, funds for basic research would rise by $1 billion, or 8 percent, to a record high of $13 billion.

But at a time when the criteria of national security are evolving from military to economic considerations, the biggest share of the R&D budget remains mired in the priorities of the cold war. Defense R&D would rise by 14 percent, while civilian R&D would grow by only 10 percent, reversing the trend of recent years. The Pentagon's share of federal R&D spending has declined from a Reagan high of nearly 75 percent, but it still dominates the new budget, with 60 percent of the R&D total.

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The budget contains relatively generous increases in funds for academic basic research, mainly under the banner of science as an indispensable ingredient of industrial competitiveness. The text accompanying the numbers in the big budget book issued by the Office of Management and Budget stresses the economic value of research, noting the high estimates of return attributed to science in economic studies.

But the biggest item in the R&D budget is a $4.6 billion request for the Strategic Defense Initiative. That's nearly $2 billion more than the total sought for the National Science Foundation, even with a healthy 17.5 percent increase proposed for NSF. The Foundation's boost, one of the largest in the entire budget, is intended to put NSF back on track toward the goal of a five-year doubling of its resources. Originally proposed by Reagan to quell concerns that the Superconducting Super Collider, though financed by the Department of Energy, would widely drain funds from "small science," the doubling goal has quietly slipped from 1992 to 1994.

The most direct obstacle has been Congress, where NSF usually fares well at the beginning of the budget process and then takes a beating in the competitive homestretch. But an important factor, too, is the White House, which, at crucial moments, has failed to lend the hapless Foundation a needed political hand. The scale of the increase now sought for NSF is such that White House assistance will be crucial.

The budget text regarding NSF pays court to "individual investigators at universities, who are essential to the US

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In Brief

Rep. George Brown, new Chairman of the House Science Committee, was asked at a recent gathering of Washington science-policy *apparatchiks* if he stood by his long-ago complaint that scientists don't back their political friends at election time. "Scientists don't even know who their friends are," replied Brown, adding, "I've got a big university in my district"—UC Riverside—"and when I go there, nobody knows who I am." Brown, in his 27th year in Congress, is a devoted science supporter.

Much bombast but little money accompany the White House boast that "By the year 2000, US students will be first in the world in science and mathematics." Was 2000 picked on an objective basis or is it arbitrary, Administration drumbeaters were asked at a press briefing? Christopher Cross, head of research at the Department of Education, responded that 2000 was intended as an "inspiration," akin to Kennedy's 1962 goal of a man on the moon within the decade. However, the moon project was a heavily financed venture with carefully calculated milestones—the antithesis of Bush's wild educational promises. At the pre-college level, the wasteland of science and math, Bush has budgeted $660 million for next year, slightly more than half a day's tab for Desert Storm.

Who says the social and behavioral sciences are under-represented in Washington science-policy circles? The Bush White House Science Office, which currently numbers about 40 professionals, will soon acquire its first social scientist: Pierre Perrole, a political scientist, on loan from NSF, where he's in the International Programs Division. Perrole will be an Assistant Director, level three in the Science Office. When Presidential Science Adviser D. Allan Bromley came on board 18 months ago, he said he would give high priority to appointment of a social scientist to his staff.

Pleas for More Science Money Draw OMB Barbs

In a departure from the customarily sparse prose of federal budget literature, the R&D section of this year's *Budget of the United States Government* tartly takes issue with complaints about inadequate federal support for research and related activities. The text is the work of the Office of Management and Budget, whose anonymous staff members have indeed grown weary of whining from a sector that has fared better than most through years of difficult budgets.

OMB's reflections on these matters are contained in a section titled "Enhancing Research and Expanding the Human Frontier." Much of it is run-of-the-mill budget stuff, proclaiming the importance of research and the Administration's unswerving dedication to its support. But not so, for example, the section on federal money for academic research facilities, plentiful until about 15 years ago, but now virtually gone, except for pork-barrel deliveries by helpful Congressmen. The OMB document notes that an "NSF survey reported an estimated $12 billion in 'needed, but unfunded capital projects' at universities."

It then goes on to observe that "Each academic institution must provide a certification that its research facilities are adequate (to perform the research proposed) as a condition of accepting research grants. This backlog reported by NSF has not had an apparent effect on the ability of universities to accept Federal research funds. However," the chapter continues, "the perception of such a large 'backlog' has led to increased calls from institutions and many members of Congress for a major expansion of Federal support for academic research facilities."

Citing what it described as a study by the White House Science Office, OMB reported that $427 million was voted last year in "earmarked" appropriations for laboratory construction at specific universities, without so-called merit review. Expressing dismay at the size of this sum—far higher than reported by others—OMB then mysteriously linked it to a minuscule $20-million-a-year fund that Congress awarded to NSF to restart a merit-based facilities program.

Money for the NSF program, it continued, has been eliminated from next year's budget. Why? The muddled answer from OMB is that "The Administration will continue to support direct Federal funding for academic research facilities where such facilities are an integral part of merit-based, competitive research projects." It didn't acknowledge that's just what the NSF program was designed to be.

OMB also suggests that the academic-facility problem is in large part attributable to misuse of overhead payments that accompany federal research grants. "Indirect Federal support for academic research facilities, through the recovery of use and depreciation charges and operation and maintenance charges on Federal grants reached almost $1 billion in 1988 (the latest year for which data are available)," the chapter states. "Almost 20 percent of these charges was for facilities depreciation," it continues, adding, "However, because indirect cost recoveries are generally credited to general funds of the institutions, there is no way to determine if the use/depreciation recoveries were actually applied to research facility construction or repair."

Responding to complaints about difficult times for individual grant applicants, the OMB stated that "awards to groups of investigators (either small groups or large centers) have been increasing, driven primarily by the need for interdisciplinary approaches to scientific problems. Each of these group or center awards is counted as a single grant, even though many researchers may be served. Thus, considering only the absolute number of awards is somewhat misleading. A more appropriate consideration should be the total number of researchers supported. By this measure, there are many more researchers supported by research grants today than at any previous time."

The discussion of research support attributes some of the misfortunes of science to policies devised by scientists, noting that "funding rates for new grants have also dropped because of increases in the amount of money per grant (both direct and indirect components) and the average length of grants. Increasing award sizes, award lengths, or both, may tend to provide increased stability and productivity for a given investigator, but these actions also depress the number of subsequent new grants that are made."

The OMB then proceeded to itemize various measures of scientific excellence, noting that "the number of science articles published by US academic researchers . . . has increased markedly. By this measure, the US is maintaining its large share of world scientific and engineering literature. In all fields, the US has a greater percentage of world publications than does any other country." Continuing with this theme, the chapter adds that "The level of citation of US papers by foreign researchers suggests that US researchers continue to exert a substantial impact on foreign publications, and thus on the world's store of scientific knowledge."

From these remarkable writings, it is not far-fetched to conclude that some, perhaps many, at OMB feel irritation toward the scientific community's unceasing and shrill demands for more. Whether the feelings have an effect on budget decisions is a separate matter. Most likely not, given the many ingredients and participants involved in these decisions. But it cannot be beneficial for science to be regarded as tunnel-visioned and greedy by the President's money minders. And increasingly, that's how it's viewed in Washington.

. . . Funds Eliminated for NSF's Lab Facilities Program

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scientific enterprise." But the additional sums budgeted are small relative to their needs. Academe has long been pleading for money for laboratory renovation and construction, but, curiously, the budget contains no funds for NSF's program for research facilities, now running on a mere $20 million a year. The Department of Agriculture budget contains $25 million for ag research facilities. These and other discordances between money and needs are spread throughout the budget, creating the impression that while the old policies may be withering under economic pressures, new policies are yet to emerge.

Science education, for example, receives prime rhetorical treatment, but the sums dedicated to its improvement remain relatively small—$1.9 billion, from kindergarten through graduate school. That's an increase of $225 million over present federal spending, assuming the accuracy of a catchall compilation of every federal expenditure that can reasonably be tagged as related to science and math education.

The budget at this point is merely a proposal to Congress, where the appropriations subcommittees last week began the annual hearings process. Capitol Hill invariably makes changes, some of which the White House tries to anticipate by coming in low or high on particular items. But rules adopted last year to limit spending severely restrict Congressional maneuvering room through fiscal 1993. Discretionary spending increases are capped at about the rate of inflation, and the budget is compartmentalized to limit horsetrading. It's not clear how this will affect Congress's zest for putting its mark on the budget. But one possibility is that it will channel more Congressional energy into shifting sums within agency budgets and other tinkerings with details.

The budget's 60 percent share of federal R&D funds for the military is stratospheric compared to Japan's 1-2 percent and Germany's 10-12 percent for that category. But even with all that R&D money still going to the Pentagon, little progress has been made in persuading the armed services to provide more support for basic research. That goal has long been pushed by academic leaders and managers of the hardpressed NSF, whose former Director, Erich Bloch, often accused the Pentagon of taking "a free ride" on civilian-supported basic research. A 2 percent increase for basic science is all that the Pentagon has budgeted for next year, which works out to a substantial decline in purchasing power.

In response to Congressional dictates, the misbegotten space station is placed on a strict spending schedule. Considering the project's uselessness, the $2 billion sought is scarce money wasted, but the increase for next year is merely $128 million, spare change in space bookkeeping. The Bush-Quayle hallucinations about a manned trip to Mars get a nod but no specific funds.

Another celebrated mega-project, the Superconducting Super Collider (SSC), is budgeted for $534 million, a $291 million increase over this year's budget. The Department of Energy last week officially proclaimed $8.2 billion as a solid estimate of the total construction cost, rejecting as unjustified the $11 billion estimate prepared by an independent assessment group that DOE itself appointed.

Meanwhile, DOE continues the scam about foreign money coming into the project, which is essential since the SSC project is predicated on one-third non-federal financing. At a meeting in Washington on February 5 of the Industry Association for the Superconducting Super Collider—a nationwide lobby of hungry contractors—DOE Deputy Secretary W. Henson Moore repeated assurances that the quest is bound to bear fruit.

The same optimism, originally voiced three years ago, hasn't yet produced anything more than an offer from India to provide $50 million in engineering services. Apart from $1 billion from Texas, the site selected for the big machine, the SSC is likely to be financed from the US Treasury, thus providing another example of "little science" receiving reverence while "big science" hogs the budget.

The federal role in promoting civilian technology is another area in which dissonance appears in the Administration's R&D policies. Under the trendy theme of competitiveness, all federal R&D agencies are supposed to pitch in to that goal. But the Bush Administration still hasn't made up its mind about the role of the US government agency most clearly responsible for assisting industry: the National Institute of Standards and Technology (NIST), which Congressional Democrats fashioned out of the venerable Bureau of Standards in the 1988 Omnibus Trade bill.

The Reagan Administration, fearful of NIST as an instrument of "industrial policy," thwarted the legislation simply by withholding money and personnel appointments related to the new functions. The Bush Administration initially followed in that track, but eventually filled the key posts, both at NIST and in the parent Department of Commerce, in which the 1988 legislation created a Technology Adminis-

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. . . NIH Must Rely Again on Friends in Congress

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tration. And the White House even came around to the point of budgeting $10 million for the current fiscal year for an industry-oriented Advanced Technology Program, which is administered by NIST. For the current year, Congress boosted that sum to $36 million. That same amount is budgeted by the Bush Administration for next year. But the Bush budget contains no funds for two companion programs at NIST, the State Technology Extension Program and the Non-Energy-Related Invention Program.

While the Bush Administration hasn't made up its ideological mind about the proper role of the federal government in industry, the heavy presence of government in agriculture is well established. NIST's State Technology Extension Program, slated for extinction if the budget plan holds, is modeled on the Department of Agriculture's ancient system of extension services—which provides technology transfer, from ag researchers to ag users. It's okay for agriculture, but suspect for industry.

The National Institutes of Health, by long tradition, is a special case on budget matters. Regarded by Congress as the legislative branch's own special ward, NIH is likely to benefit budgetarily this year from the death of one of its great Congressional champions, Rep. Silvio Conte (R-Mass.), who died last week at the NIH Clinical Center, where he was hospitalized for a blood clot on the brain. The budget that the White House is seeking for NIH is deliberately modest, calling for a mere 5.7 percent increase. Though the last Congress directed NIH to get on a stable footing of 6000 new and competing grant awards per year, the proposed budget would finance only 5785. What better memorial to Mr. Conte than an adequate budget for his favorite government agency?

The budget is good to the Department of Agriculture's competitive-grants program, which last year was embellished with the title of the National Research Initiative (NRI). Though the program amounts to only about one-fifth of USDA's basic research activities, the competitive feature has long been favored by the White House Science Office, which values peer-reviewed research competition as a presumed safeguard of scientific quality and a shield against pork-barrel intrusions. Congress signalled its skepticism last year by setting a spiteful 14 percent overhead cap on grants awarded by the program. For fiscal 1992, the NRI is budgeted for $125 million, a 71 percent increase over the current figure.

Apparently anticipating Congressional resistance to an expansion of politically pristine methods at USDA, the budget text asserts that NRI "is necessary because: (1) the issues and opportunities are national in scope; the Nation as a whole is the beneficiary, not just individual states or industries; (2) the NRI undertakes research that does not, in general, produce specific patentable or marketable prod-

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How to Order the Books Containing Budget Data

The fine details of the Bush fiscal 1992 R&D budget and related matters are contained in four publications.

The basic document is the annual heavyweight budget tome issued by the Office of Management and Budget, *Budget of the United States Government, Fiscal Year 1992* (1239 pp., $41; order from: USGPO, Superintendent of Documents, Washington, DC 20402-9325; tel. 202/783-3238). It mainly consists of tables showing recent and proposed spending for programs of all federal agencies. In addition, R&D and science-education policies are discussed in a 40-page section, "Enhancing Research and Expanding the Human Frontier" (see P. 2 of this issue of SGR for excerpts).

This year, there are also three slick supplements to the budget literature, all prepared under the auspices of the Federal Coordinating Council for Science, Engineering, and Technology. An appendage of the White House Office of Science and Technology Policy, the Council vanished as a working entity during the Reagan Administration, but has been revived by Presidential Science Adviser D. Allan Bromley to fulfill its mandate of coordinating the activities of federal research agencies. Reflecting efforts to orchestrate government-wide R&D activities, the supplementary publications describe budgets and spending plans in three areas designated for favored treatment by the Bush Administration:

Grand Challenges: High Performance Computing and Communications, reports plans for computer and network developments involving seven federal agencies (57 pp., no charge; order from: NSF, Committee on Physical, Mathematical, and Engineering Sciences, Computer and Information Science and Engineering, 1800 G St. NW, Washington, DC 20550; tel. 202/357-7936).

By the Year 2000: First in the World, spells out government-wide activities and aims concerning science and math education (summary, 77 pp., full report, 321 pp., no charge for either; order from: Department of Energy, Committee on Education and Human Resources, 1000 Independence Ave. NW, Washington, DC 20585; attn. Peggy Dufour; tel. 202/586-7970).

America's Climate Change Strategy, outlines federal programs concerning greenhouse effect, global change, etc. (22 pp., no charge; order from: Committee on Earth and Environmental Sciences, c/o US Geological Survey, 104 National Center, Reston, Va. 22092; tel. 703/648-4450).

Congress Urged to Upgrade Its Science Advice

Distracted by the fiscal needs of social and welfare programs, Congress is often the barrier to more money for the National Science Foundation and other civilian science agencies beyond the charmed field of health research. Now a bluechip outside advisory group says Congress should reach out for more and better advice on science issues and should study its handling of science budgets and programs.

The recommendations are contained in a new report, ***Science, Technology, and Congress: Expert Advice and the Decision-Making Process*** (44 pp., available without charge from the Carnegie Commission on Science, Technology, and Government, 10 Waverly Place, New York, NY 10003; tel. 212/998-2150).

The Carnegie Commission is a kind of government-in-exile on science that for the past several years has been issuing reports on various aspects of science-government relations. Its impact on real affairs has so far been difficult to discern. But, staked by the Carnegie Corporation, the Commission draws big names, mostly Democrats, plus some civilized Republicans. It may reasonably be speculated that if the Democrats ever regain the White House, the Commission could, formally or informally, serve as the starting point for the presidential science-advisory apparatus. The panel that produced the report was chaired by former Congressman John Brademas, President of NYU. Serving with him were Jimmy Carter, Florida Governor Lawton Chiles, former Senators Daniel J. Evans and Charles McC. Mathias, and former White House Science Adviser H. Guyford Stever, workhorse of the Washington science-policy circuit.

The report recommends creation of a bi-partisan Congressional Science and Technology Study Conference, and urges Congress to "encourage the establishment of a non-profit Science and Technology Institute to provide weekly bulletins, briefings, legislative analyses, workshops, training, and conferences on major issues before Congress." The report adds that the Institute "could coordinate the preparation of rapid-response analyses for Congressional committees and individual Senators and Representatives. This effort," it explains, "might include rapid-response analyses by experts in academia, industry, nongovernmental organizations, and elsewhere."

It also urges Congress to make direct use of the advisory services of the National Academy of Sciences. "Congressional authorizing committees," the report states, "could be appropriated funds specifically for the purpose of requesting studies by the National Academy of Sciences complex, and perhaps by other non-government organizations." Offering another approach, the report states that "Congress could make an endowment grant to the Academy to allow compensation for studies initiated at the direct request of congressional committees."

Reflecting its establishment roots, the report also comes out against earmarked, or pork-barrel, appropriations for scientific facilities. It's by this route, of course, that have-not states and institutions have been getting shares otherwise denied to them. The report urges that "Congress more frequently use the results of the scientific merit review process in making decisions on the funding of science and technology projects and facilities." It concedes that pork-barreling arises from both a dearth of funds and doubts about the equity of the reigning distribution system. "Nevertheless," the report states, "the product of merit review—a ranking of proposals based on technical merit—can serve as an effective guide when making many science and technology policy decisions."

What the report fails to note is that the Congress, along with the rest of the capital, is awash with scientific advice, solicited and volunteered. It casually suggests that the proposed Science and Technology Study Conference could "augment" two major founts of legislative science advice and information, the Congressional Office of Technology Assessment and the Science Policy Research Division of the Congressional Research Service. But the report's several references to the two agencies fails to recognize their value to Capitol Hill.

OTA annually produces scores of deeply researched and well-organized reports for Congressional committees, and it has demonstrated a capacity to do them long or short, fast or slow, contrary to the report's assertion that OTA reports "typically take 12 to 24 months to produce." The Science Policy Research Division of the Congressional Research Service specializes in fast and short studies for its Congressional clients.

Congressional committees responsible for scientific and technical matters are well-staffed with appropriately trained professionals, regular staffers and visiting fellows. The report notes that over 450 Congressional Science and Engineering Fellows have served in Congress since 1973, and

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Budget

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ucts, but knowledge that will be broadly applicable; (3) the need is urgent; the issues to be addressed require action now and cannot be delayed or taken up piecemeal; and (4) there are broader benefits, which are difficult to quantify, related to protection of the environment and public health."

The budget reflects the ideological muddle of the Bush Administration. If the Cold War is over, as Mr. Bush himself has proclaimed, why would he have defense R&D grow faster than civilian R&D? Why are increases proposed for nuclear-weapons research at a time when military requirements are focused on conventional weapons? Why is the barrage of inspirational talk about education and industrial competitiveness accompanied by a paucity of money?

The answer is that ideological dissonance still rages behind the "good budget" presented by Dr. Bromley.—DSG

In Quotes: A Contrary View on Scientist "Shortage"

From an article, "I Never Promised You First Place," by Iris C. Rotberg, a Program Director in the National Science Foundation's Directorate for Education and Human Resources, published in the December 1990 Phi Delta Kappan, *journal of Phi Delta Kappa, professional education fraternity (Bloomington, Indiana).*

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. . . an analysis of SAT mathematics scores shows that there is no problem with the supply of highly qualified students. These scores have actually improved in recent years. In 1977, the 90th percentile score was 628; in 1986, it had risen to 642. The reason that a smaller proportion of high-achieving mathematics students chose to study the physical sciences or mathematics has nothing to do with any lack of proficiency in these fields. These students are simply aware of projections that show that the physical sciences (with the exception of materials science) are not expected to be high-growth fields in the 1990s. And they are not unaware of the fact that other fields, such as engineering, business, and law, are more financially rewarding. They also want to pay their loans . . . .

Economic studies over the past 30 years generally support the assumption that the labor market for scientists and engineers does make the necessary adjustments, although there may be temporary spot shortages because of the time needed to complete the educational process. Nor is there any reliable evidence that the business community is complaining about the numbers or quality of mathematicians, physicists, chemists, or engineers being turned out by US universities. . . .

I believe that the most difficult challenge may not be improving the quality of education for science and engineering majors, but providing a better education for other students—who represent the large majority—in a world requiring ever-greater technological skills. . . . Moreover, US society will become increasingly polarized if a significant proportion of our population lacks the skills needed to compete for jobs that provide a reasonable income. . . . And because poverty correlates so highly with educational problems, these problems are likely to be exacerbated over the years if the current trends continue.

Expenditures on education also greatly favor the most affluent regions, schools, and students. The fact is that low-income and minority students, on average, have less opportunity to study science and mathematics than do other students. . . .

The public perception that the US is falling behind in science and mathematics . . . is based on a narrow criterion that has serious methodological deficiencies. The risk is not simply that we will underestimate our accomplishments. Of far greater importance is the likelihood that too narrow a definition of the problem may lead us to "solutions" that are at best trivial and may indeed be counterproductive to addressing more important problems. It is unlikely that increasing requirements for traditional science and mathematics courses or memorizing facts that can be readily assessed on standardized tests will encourage greater numbers of high-achieving youngsters to become scientists and mathematicians or give young people who do not attend college the skills they need to compete in the marketplace.

Clearly, we have problems in science and mathematics education. But the bottom line is not so grim as the current rhetoric would have us believe, nor are the problems identified by that rhetoric necessarily the ones that are most troublesome to the welfare and productivity of the society as a whole.

Science and Congress

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that the demand by Committees exceeds the number of available candidates. What it fails to note is that Congress likes visiting Fellows because they come free—paid for by sponsoring organizations. If a committee or member really wants a staffer, money is found for salary.

As for bringing the Academy into closer ties with Congress, the problem there is that the Academy can't shake the image of Washington tub thumper for academic basic science. The reason is clear: the Academy *is* a Washington tub thumper for academic basic science, no matter how intense its protestations of purity and objectivity.

The big legislative problem weighing on the scientific community is an antiquated layout of committee jurisdictions that puts science agencies in direct budget competition with politically powerful social-welfare agencies. The most glaring example is NSF, which must contend for the same pot of money with the Department of Housing and Urban Development and the Department of Veterans Affairs.

The Carnegie report doesn't engage that problem directly, but it's not unlikely that the report's mass of verbiage on advice and consultation is really aimed at eventually reworking the jurisdictions. The problem is hinted at in various references to the complexities of Congressional committee jurisdictions.

The panel says it will issue three more reports: on OTA and the various other Congressional support agencies, on "Congressional procedures, including appropriations, authorizations, and oversight of S&T programs," and on"ways that Congress can gain a longer-term perspective on S&T issues, executive-legislative branch interactions, scientific literacy, how an informed electorate influences the congressional agenda, and the role of the media in informing the public of S&T-related issues."

It may be hoped that the forthcoming reports will address an uncomfortable fact of Congress and science, namely, that when legislators go looking for scientific advice, their main goal is to find some political advantage. For example, members of the Texas delegation won't believe anything unkind about the Superconducting Super Collider.

More In Print: US Lab Directory, Highway Research

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report states, "we can see little evidence to support a contention that the PYI program uniquely fosters cooperation between academia and industry." What it's good for, the evaluators didn't say.

Order from: NSF, Forms and Publications Unit, Room 232, 1800 G St. NW, Washington, DC 20550; tel. 202/357-7668.

Government Research Directory: 1991-92 (1200 pp., $390), sixth edition, privately published standard directory, listing over 3700 federal research facilities, large and small. Each entry includes top executive, address, phone and fax numbers, topics of research, publications, etc.

Order from: Gale Research, Inc., PO Box 33477, Detroit, Mich. 48322-5477; tel. 1-800-877-GALE.

Safety Research for a Changing Highway (160 pp., $21), by the Transportation Research Board of the National Academy of Sciences, spotlights another element of the Reagan legacy of domestic neglect, a decline in federal support of highway safety research from an average of about $55 million annually between 1975-81 to "about $35 million, where it stands today." Noting that annual highway mayhem now totals 18 million crashes, four million injuries, and 45,000 fatalities, the report calls for more federal research money, including funds to establish several university based research centers.

Also available: the Transportation Research Board's ***1991 Publications Catalog*** (61 pp., no charge), listing hundreds of publications issued by the Board in recent years.

Order from: National Academy of Sciences, Transportation Research Board, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-3214.

Student Aid and the Cost of Postsecondary Education (109 pp., no charge), by the Congressional Budget Office, a review of federal student-aid programs as background for reauthorization of the Higher Education Act of 1965. Among the topics covered are types and amounts of aid, criteria for assistance, family-income levels of recipients, and proprietary schools—whose high default rates have publicly tarnished student-loan programs.

Order from: Congressional Budget Office, Publications, 2d and D Sts. SW, Washington, DC 20515; tel. 202/226-2809.

Trends '90: A Compendium of Data on Global Change (250 pp., no charge), from the Department of Energy's Oak Ridge National Laboratory (ORNL), numbers, going back 160,000 years, on atmospheric carbon dioxide and methane concentrations, plus trends from combustion of fossil fuels, surface air temperatures worldwide, etc.

Order from: Oak Ridge National Laboratory, Carbon Dioxide Information Analysis Center, PO Box 2008; MS-6335, Oak Ridge, Tenn. 37831-6335; tel. 615/574-0390.

Report on Critical Technologies, Plans for New Institute Due Soon

The White House Office of Science and Technology Policy (OSTP) is reported close to completion of a Congressionally mandated ***National Critical Technologies Report***, which is supposed to list up to 30 technologies deemed essential for the nation's economic and military well-being. After the report is delivered to Congress, OSTP is expected to announce its plans for carrying out a related assignment—establishment of a Critical Technologies Institute, to devise strategies for pursuing the goals.

A $5 million fund for the Institute was written into the Defense Appropriations bill last year, with the money to be turned over to OSTP for formulating a design and financing initial operations of the new organization. The founding legislative measure, sponsored by Senator Jeff Bingaman (D-New Mexico), provides for a 30-member board of trustees, of whom 10 are to be senior government officials, with the rest drawn from industry and other sectors. D. Allan Bromley, Director of OSTP, will serve as Board Chairman.

The Institute will be organized as a Federally Funded Research and Development Center, which means Washington pays for it, but the staff—expected to number 10-12—will not be government employes. Still to be decided is whether the Institute will be attached to OSTP or have a different homebase.

OSTP, with a budget of $3.5 million for its own operations, is skittish about assuming responsibility for the Institute, since there's no guarantee of another serving of money after the $5 million.

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In Print: Bio-Warfare, Food Safety, DOD Labs, Etc.

The publications listed are obtainable as indicated—not from SGR.

Biological Warfare: Better Controls in DOD's Research Could Prevent Unneeded Expenditures (GAO/NSIAD-91-68; 20 pp., no charge), by the General Accounting Office (GAO), investigative service for the Congress, a blurry glimpse at the Army's program of defensive research against biological warfare, for which GAO says a total of $370 million was allocated from 1984 through 1990. Of 218 ongoing or recently completed projects that it reviewed last April, the GAO states, 49 involved biological agents that had not been certified as "validated threat agents" by the Armed Services Medical Intelligence Center, at Fort Detrick, Md., homebase of BW research. On another 57 projects, the information on threat was skimpy, the GAO said. The Army's response, according to the GAO report, was that "the Intelligence Center's interpretation of threat agents was too narrow . . ." Without assessing the validity of that alibi, the GAO recommended the discontinuation of projects that do not "address validated warfare threat agents." The report includes a list of research in progress and vaccines and drugs developed by the BW program since 1965.

Also from GAO: ***Food Safety and Quality: Who Does What in the Federal Government*** (GAO/RCED-91-19A; 32 pp., no charge), a survey of the federal laws and agencies that deal with the nation's food supply. The work is mainly concentrated in FDA, EPA, Commerce and USDA, with most reporting bigger workloads and a decline in staff and budget power between 1980-89. "When asked what they believed would be the critical food safety and quality issues of the 1990s," GAO reports, "officials of the. . .agencies most often mentioned microbiological contamination and pesticide/chemical contamination of foods."

Order GAO reports from: USGAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.

Defense Laboratories: Proposals for Closure and Consolidation (91-135 SPR; 66 pp., no charge), a look at how the Pentagon is responding to last year's Congressional directive to prune and consolidate its research empire, which currently numbers 76 inhouse labs (with 1987 staffing of over 60,000 and combined budgets of $6.3 billion). With little public attention, a major upheaval is underway in the size and shape of inhouse military R&D. But the steps being taken raise questions about coordination and efficient use of government research facilities, according to the GAO report, written by Michael E. Davey, a specialist in the Science Policy Research Division of the Congressional Research Service (CRS), part of the Library of Congress. The individual services, which run the labs, have received no guidance from the Pentagon, the report states, and there's no evidence of efforts to "develop an overall coordinated laboratory restructuring proposal that considered the interests of DOD, as well as the individual services." The report notes that the only service to announce consolidation plans so far is the Air Force, which has already laid off 461 scientists and engineers, with "thousands of additional layoffs" to take place "by the mid-1990s." The Navy's plans are scheduled for completion in April, while the Army has not set a deadline.

Also from the CRS Science Policy Research Division: ***Organ Transplantation: Demand, Supply and Federal Policies*** (91-107 SPR; 35 pp., no charge), a review of recent federal legislation and regulations concerning organ transplants, along with data on types of transplants, costs, reimbursement policies, research expenditures, etc. The report is by Bernice S. Reyes, an analyst in the Division.

Order from: Science Policy Research Division, Congressional Research Service, Library of Congress, Madison Building, Washington, DC 20540; attn. Ms. Raap; tel. 202/707-7014.

Complex Cleanup: The Environmental Legacy of Nuclear Weapons Production (S/N 052-003-01222-7; 212 pp., $10; add 25 percent for international orders), by the Congressional Office of Technology Assessment, says a near-half century of nuclear weapons production has left a colossal, dangerous mess on and under large regions of the American landscape and that the Department of Energy's cleanup plans do not warrant confidence for efficacy, time, or cost. The report notes, too, that "despite some DOE statements about the lack of immediate health threats, public health concerns have still not been investigated adequately by DOE or other government agencies." In a rare expression of fervor, OTA calls for "an aggressive, scientifically sophisticated, site-specific and open evaluation of possible off-site health effects by independent environmental health professionals." What the report doesn't say is that DOE still suffers the coverup and secrecy obsessions of its ancestral origins, the Atomic Energy Commission.

Order from: USGPO Superintendent of Documents, Washington, DC 20402-9325; tel. 202/783-3238.

NSF's Presidential Young Investigators (PYIs) Program: A Study of the First Two "Classes" (NSF 90-150; 63 pp., no charge), a retrospective on the startup years, FY '84-'85, of NSF's program to create a cadre of academically based young scientific superstars, 200 per year, and link them to industry with combined NSF-industrial support of up to $100,000 annually. The study, by NSF's Program Evaluation Staff, compared the PYIs with finalists in the PYI competition and ordinary NSF grantees. In rank and research funding, the PYIs moved up faster. But the PYIs mysteriously reported fewer contacts with industry and less industrial consulting than the finalists or the grantees, though the PYIs' industrial matching reached nearly 80 percent of the maximum allowed. "Reviewing survey findings," the

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